

Danaus chrysippus Linnaeus, 1758 ;
a review of records and present status
in the Maghreb countries of Morocco,
Algeria and Tunisia (Lepidoptera, Danainae)

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Summary

Danaus chrysippus Linnaeus, 1758, was first reliably noted from Algeria in 1912, from Morocco in 1943 and from Tunisia in 1952 ; it has since been recorded there sporadically. Sightings have increased in recent years and some have wrongly been claimed as new country records, due possibly to the erroneous claim in early editions (and English language editions/reprints up to 1993) of Higgins & Riley's "Field guide to the butterflies of Britain and Europe" that the species had not been recorded from Algeria or Tunisia. Known records of *Danaus chrysippus* in the Maghreb countries of Morocco, Algeria and Tunisia are reviewed here. It is shown that the butterfly has established breeding populations in all three countries. Hostplants are discussed.

Résumé

Danaus chrysippus Linnaeus, 1758, fut signalé pour la première fois d'Algérie en 1912, du Maroc en 1943 et de Tunisie en 1952 ; il a fait l'objet, depuis, de citations sporadiques. Les observations se sont multipliées ces dernières années, dont certaines indûment revendiquées comme nouvelles, censément en raison de l'assertion erronée des premières éditions (et éditions en langue anglaise, réimprimées jusqu'en 1993) du «Guide des Papillons de Grande-Bretagne et d'Europe» de Higgins & Riley, donnant l'espèce comme inconnue d'Algérie ou de Tunisie. Les citations de *Danaus chrysippus* des pays maghrébins du Maroc, d'Algérie et de Tunisie sont ici rassemblées. Il est démontré que le Petit Monarque a établi des colonies stables dans ces trois pays. Les plantes-hôtes sont étudiées.

Zusammenfassung

Danaus chrysippus Linnaeus, 1758, wurde aus Algerien erstmals 1912 gemeldet, aus Marokko 1943 und aus Tunesien 1952 ; seitdem wurde er dort sporadisch gesichtet. In den letzten Jahren häuften sich die Beobachtungen ; dabei wurden

einige fälschlich als Erstnachweise bezeichnet. Dies ist vermutlich darauf zurückzuführen, daß in früheren Ausgaben des Feldführers „Die Tagfalter Europas und Nordwestafrikas“ von HIGGINS und RILEY irrtümlich behauptet wird, die Art sei aus Algerien oder Tunesien nicht bekannt. Die bisher bekannten Nachweise von *Danaus chrysippus* in den Maghreb-Ländern Marokko, Algerien und Tunesien werden zusammengestellt. Es wird gezeigt, daß der Falter in allen drei Ländern bodenständige Populationen besitzt. Die Futterpflanzen werden diskutiert.

Introduction

There has been some confusion in recent years over the occurrence and distribution of the butterfly *Danaus chrysippus* Linnaeus, 1758, in the Maghreb states of Morocco, Algeria and Tunisia. HIGGINS & RILEY, in all English language editions to date of their Field Guide to the Butterflies of Britain and Europe, currently the only guide to the region, stated that the butterfly is a rare migrant in Morocco and has not been reported from Algeria or Tunisia. The most recent French language edition is more up to date.

A mass of further information has been published, in a number of languages in a variety of entomological journals, on the distribution of *D. chrysippus* in the Maghreb and in Europe with some recent papers claiming new records for Algeria and Tunisia. There has also been speculation and discussion on the probable hostplants of *D. chrysippus* in North Africa.

This paper sets out to collate published records to date ; to assess the present status of the butterfly in the Maghreb and to identify hostplants in each country. All localities can be found on the map (Fig. 1). Whilst the occurrence of *D. chrysippus* in Europe is outside the scope of this paper, it has been seen more frequently there in recent years and published records noted are included in the form of a bibliography.

Records to date

(M) = Morocco ; (A) = Algeria ; (T) = Tunisia

1905 — JOANNIS (1908 : 83), in his list of Saharan Lepidoptera recorded by Chudeau on a voyage from Algiers to Timbouctou in 1905-6, noted *D. chrysippus* 'var.' *alcippus* Cramer, 1777 taken at Oued Kadamellet on 21 September 1905 and as this has been quoted (including by the present author !) as the first published record of *Danaus chrysippus* in Algeria, it is worth taking a moment to establish where Kadamellet lies. It transpires that the locality is in Niger.

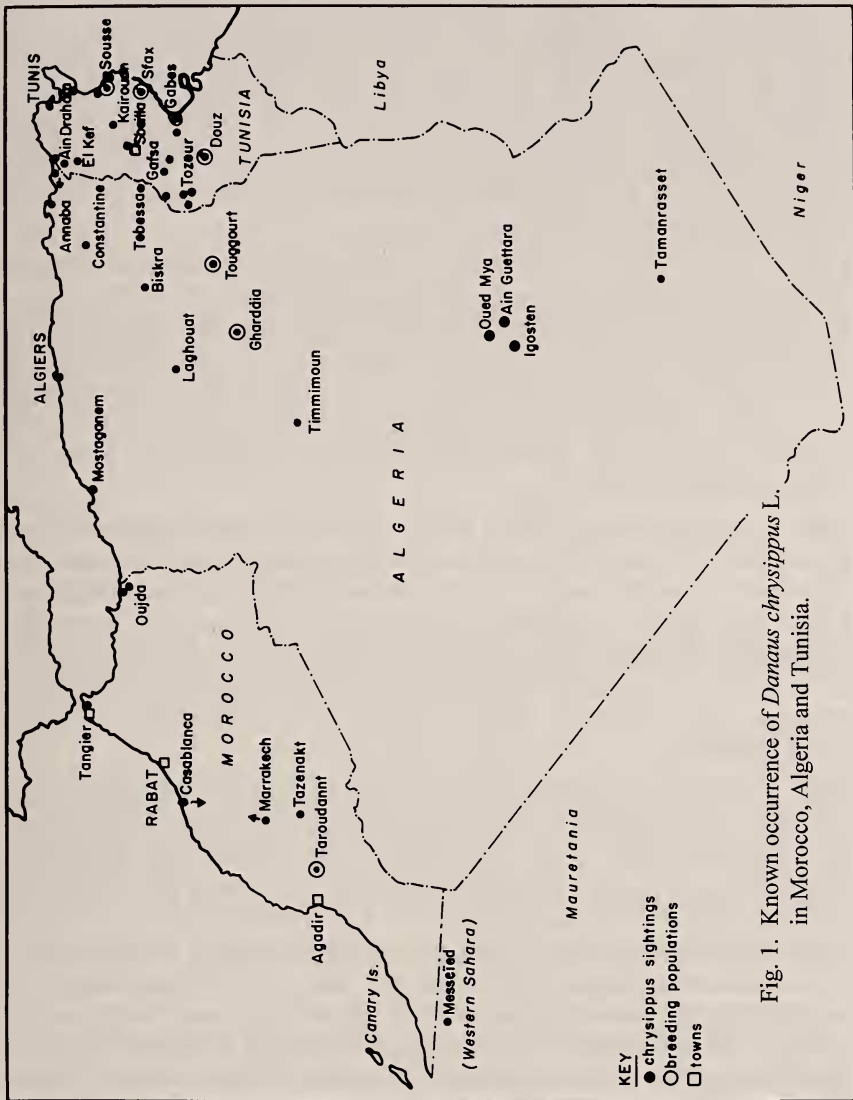


Fig. 1. Known occurrence of *Danaus chrysipus* L. in Morocco, Algeria and Tunisia.

The author was unable to find reference to Oued Kadamellet on any modern map. However, Mont Kadamellet was eventually identified on a very old map at 19° 34' N, 8° 36' E, some 45 km NNE of Ifrouane, Aïr, the position loosely described by JOANNIS (1908 : 82). In June 1905, an agreement between the Commandant of what was then Haut Sénégal et Niger and the military commander of the Département de l'oasis (part of Territories du Sud Algerien), determined a boundary between Algeria and French West Africa which was completed in principle by the Niamey Conventions of 1909 (International Boundary Study No. 99). Thus 'Kadamellet' was and is in Niger, about 200 km SE of the Algerian border.

1907 — SEITZ (1907 : 75-76), noted that [form] *chrysippus* was to be found on the Canary Islands "and the opposite districts of Morocco ... The absence of the insect from Algiers [Algeria] is very remarkable ... ab. *alcippoides*... in the Palearctic region only on the Canaries and in the opposite districts of Morocco ...". The source of these comments is not clear ; there are no *D. chrysippus* from N Africa in the Seitz collection, now in the Senckenberg Museum, Frankfurt am Main (H. Schroeder, pers. comm.)

1912 — ROTHSCHILD (1913 : 114), recorded a male specimen from South Oued Mya (A) [30 April 1912] (another was seen but not captured) ; a female north of Aïn Guettara (A) [8-11 April 1912] and a male from Igosten, Tidikelt (A) [15 April 1912] among the butterflies collected by Hartert in an expedition to the central western Sahara. He correctly noted these specimens as the first records for Algerian territory. The specimens remain extant in the Rothschild collection at the BM(NH).

1923 — DEMAISON (1923 : 134) reported his brother finding a single f. *alcippus* at Ghardaia (A) on 22 April 1923 and seeing several more on subsequent days in the same place. His brother also apparently found it commonly at Touggourt oasis (A) on 1 May 1923. In April 1927 Demaison's brother returned to Ghardaia but saw no further specimens (Demaison, 1932 : 93), prompting Demaison to suggest that its occurrence in large numbers in the area in 1923 was due to an "accidental migration". Apparently all individuals seen then were f. *alcippus*. He mentioned *Gomphocarpus fruticosus* (Asclepiadaceae), a known hostplant of *D. chrysippus* (ACKERY & VANE-WRIGHT, 1984 : 210), as a possible hostplant there.

1943 — RUNGS (1945 : 15) noted 6 examples of f. "*kanariensis*" Fruhstorfer, 1898, [a doubtfully distinct race essentially of the "*chrysippus*" form (ACKERY & VANE-WRIGHT, 1984 : 115)], and one f. *alcippus* at

Messeïed, Rio de Oro in SW Morocco (Western Sahara), taken on 20 January 1943 by Morales Agacino who observed further adults and larvae associated with *Calotropis procera* (Asclepiadaceae).

1947 — RUNGS (1950 : 144-5) stated that despite much travelling in southern Morocco, he failed to find *D. chrysippus* until December 1947 when he found all stages of the insect abundantly some kilometres west of Taroudannt (M) ; of 38 specimens taken, only 6 were f. *alcippus*, the remainder being “f. *kanariensis*” [*chrysippus*] or *alcippoides*. The hostplant was *Asclepias curassavica* f. *atropurpurea* (Asclepiadaceae) ; RUNGS expressed surprise at the apparent rarity of *D. chrysippus* in view of the availability of a number of different and presumably quite suitable Asclepiad hostplants.

1952 — CHNÉOUR (1953) recorded Bede telling him that it was to be found frequently in the Biskra and Ghardaia areas of Algeria and that Kruglik had observed it in some numbers at Nefta (T). He recorded the capture, by Demoflys, of a single f. *alcippoides* at Gabès (T) on 4 July 1952. He added that since the time of this first observation, other specimens had been seen at Tozeur (T), Aïn Draham (T) and Mégrine (T) (by Chpakowsky) and at Barrage de l’Oued Kebir (T) (by Massal and Arnould). This record was repeated (Chnèour, 1954 : 222) and the butterfly was depicted on the front cover of volume 7 of Bull. Soc. Sci. nat. Tunis.

1956 — WYATT (1956 : 220) recorded the species in the Sous valley (Taroudannt) (M) and noted that approximately 30% of individuals seen were f. *alcippus*.

1970 — HIGGINS & RILEY, in their Field Guide to the Butterflies of Britain and Europe, stated that *D. chrysippus* was a rare migrant in Morocco and not reported from Algeria or Tunisia ; claims reiterated in subsequent English language editions (1973, 1975, 1980, 1983) and reprints up to 1993. The French language edition of 1988, the only one the author has examined, went some way to correcting these mistakes.

1971 — OWEN (1971 : 138 [Fig. 9.2]), included all of Tunisia and most of Algeria and Morocco well into the Sahara desert in the distribution of f. *chrysippus* in Africa. He showed f. *alcippus* occupying most of Morocco and part of western Algeria, far removed from the extensive populations of western Africa and went on to say (1971 : 140) that maps were prepared after examination of the large collections in the British Museum [Natural History] and in the Hope Department of Entomology at Oxford. This is puzzling since the author was unable to find any *D. chrysippus* from N Africa other than from Egypt, Libya

and Mauretania and those recorded by Rothschild in 1912 in the BM(NH) collections, or in the Hope Department of Entomology at Oxford University Museum. A number of specimens from Morocco and Tunisia have been deposited by the present author in the BM(NH) collection.

1971 — KUDRNA (1972 : 268) recorded the capture by Gawadi and Wilson on 1 September 1971 of 1 male and 3 females at Taroudannt (M) where it was common and fresh, having apparently bred locally.

1974 — PIERRE (1974) provided comprehensive discussion on the distribution of *D. chrysippus* throughout Africa and included parts of Algeria in the distribution of f. *alcippus*, as well as including W Moroccan and S Algerian records of f. *chrysippus*. This was based on a number of specimens in the collections of the Museum National d'Histoire Naturelle in Paris, namely Alger, Maison Carée (1, ex. Balachowski — *alcippus*) ; Touggourt (A) (5, ex. Babault — *alcippus*) ; Ghardaia (A) (1, ex. Demaison — *alcippus*) and Timmimoun (A) (1 *chrysippus*) (J. PIERRE, pers. comm.)

1975 — SAMRAOUI (1993 : 69) noted a specimen captured in Tebessa (A) in 1975, in the INVP collection in Algiers.

1979 — DEVARENNE (1981 : 171) recorded it in March and September/October 1979 around Ghardaia (A) and figured an extreme male aberration taken in October of that year.

1979 — DE FRIENA (1981) recorded Menrad taking a series at Sousse (T) on 16 December 1979, some of which were f. *alcippoides* ; he also discussed several possible hostplants.

1979/80 — SCHUURMANS (1981) found *D. chrysippus* at Sousse (T) in 1979 and recorded Myncke finding it commonly from the beginning of August until mid-October at Monastir (T), Sousse (T) and Jendouba (T).

1980 — LEMPKE (1981 : 35) recorded a specimen at Sousse (T) on 2 March 1980.

1980 — VAN CAPPELLEN (1981) illustrated a female specimen found by Bolland on 11 March 1980 at Sousse (T).

1980 — LÜTTGEN (1981 : 55) found two examples of the nominate form at Tozeur (T) on 4 October 1980.

1980/1981 — There are specimens in the Museum National d'Histoire Naturelle, Paris, from near Sbeitla (T) (7, Ex. Barbery & Aubertin, 1980/81 — *chrysippus*) ; R. Lheureux apparently also observed 3 spe-

cimens at Béthioua (A) and Mostaganem (A) in 1980 (J. PIERRE, pers. comm.)

1982 — BURTON (1982) mentioned several hundred *D. chrysippus* seen by Tombs in the region of Monastir (T) and Sousse (T) from 6 to 10 June 1982.

1983 — CASSAR (1983) noted a total of 19 specimens on 10 and 13 July 1983 near Kairouan (T), La Kesra (T) and El Kef (T).

1985 — Between 12 and 24 June 1985, LEGLER (1986) saw a number of specimens in the area of Hammamet (T).

1985 — DEVARENNE (1990 : 154) reported it as common in various localities in Tunisia ; all stages of the butterfly were found in May 1985 between Sousse (T) and Port-el-Kataoui (T) feeding on *Pergularia tomentosa* (Asclepiadaceae). The butterfly was seen in "almost every part of Tunisia, including Tunis".

1985/6 — CASSAR (1989) reported a single specimen seen by Balzan at Tunis (T) on 9 April 1985 and scores seen at Douz (T) in early October 1986. He went on to report a male specimen on 9 October 1986 at Touggourt (A) ; this last record was believed to be the first for Algeria.

1988 — HÜNI (1988) saw the species near El Djem (T) and Sidi Bou Ali (T).

1988 — STEINIGER & EITSCHBERGER (1990 : 169), noted a specimen seen to the east of Tangier (M) on 25 October 1988.

1990 — SAMRAOUI & BENYACOUB (1991) observed a build up of *D. chrysippus* apparently migrating from east to west in the region of Annaba (A) and El-Kelaa (A) in May 1990 ; the last specimen seen in Annaba was on 17 October. On 27 August 1990 about 20 specimens were seen at Touggourt (A), also apparently moving in an east/west direction.

1990 — Observed to be widespread in small numbers between Casablanca and Marrakech (M) on 3 October 1990 ; also seen near Tazenakht, 60km SW of Ouarzazate (M) on 11 October 1990 (Martin Jacoby, pers. comm.).

1991 — SAMRAOUI *et al.* (1992) noted the butterfly at Lac Bleu (A) (2) on 28 May 1991, El-Chatt (A) (1) on 14 June 1991, Lac des Oiseaux (A) (1) on 21 June 1991, Biskra (A) (numerous) on 19 July 1991, Laghouat (A) (numerous) on 26 July 1991, Ghardaia (A) (numerous) on 28 July 1991, Touggourt (A) (3) on 5 August 1991 and Tamanrasset (A) (1) on 10 October 1991. *Calotropis procera* (Asclepiadaceae) was suggested as a probable hostplant in central and southern Algeria.

1991 — 1 example was seen at the Gorges de Zeghzal, Berkane (M) on 28 September 1991 and about 15 specimens at the Moulouya delta (M) on 9 October 1991 by G. Chavanon (H.-J. Falkenhahn, pers. comm.).

Author's observations 1991-1993

MOROCCO : On 11 September 1991, a few individuals were seen in different localities on the eastern and northern outskirts of Taroudannt. The following day quite large numbers (40-60) were seen west of the town where there was a large stand of *Asclepias curassavica* growing in an irrigation ditch (TENNET, 1993 : 27). On 3 March 1992 the area was revisited when it was found that the irrigation ditches had been cleared of all "debris", including *curassavica* plants ; only a single *D. chrysippus* was seen to the east of Taroudannt. On 11 May, four specimens were seen in close proximity to *curassavica* plants at Ait Iazza, east of Taroudannt and on 4 June, a single example was seen flying across the main road 24 km east of the town. A further specimen was seen just south of Taroudannt on 2 September, the last visit of that year.

In 1993, the locality west of Taroudannt where both the butterfly and hostplant were common in the autumn of 1991, was visited on 26 May. Although *curassavica* had begun to repopulate the ditch, individual plants were very small and no *D. chrysippus* were seen. However, at Ait Iazza, both the plant and the butterfly were quite common ; with about 20 butterflies observed in a half hour period.

Of *D. chrysippus* butterflies seen in Morocco, some 60-70% were of the nominotypical form, with the remainder being f. *alcippus* or *alcippoides* ; the latter were very variable, displaying a white hindwing patch of variable size or merely a few white scales around the inner margin.

The author travelled extensively in Morocco in 1992 and 1993 but never saw *D. chrysippus* other than around Taroudannt and the Sous river valley. It was seen on each visit to the area, even when merely "passing through" ; individuals appeared generally to be freshly emerged.

ALGERIA : From 15-17 March 1992, small numbers of *D. chrysippus* (about 10 in total) were seen close to the town of Ghardaia in central Algeria. Some individuals were possibly in transit, but others appeared settled in an area west of the town where *Pergularia tomentosa* (Asclepiadaceae) grew commonly. A few *Asclepias curassavica* plants seen incorporated in a display along the central reservation of a street on the outskirts of Berriane, 40km north of Ghardaia, were thickly

covered in dust ; no *D. chrysippus* were seen. It was not seen at Touggourt some days later, although only a very cursory search was carried out. Two specimens were seen at Ghardaia on 3 October.

In 1993, 2 individuals were seen flying aimlessly in the centre of Tamanrasset town on 24 April and a third (or one of the previous two again ?) in the same place the following day.

A single example was seen flying across the road 34km south of Ghardaia on 1 May. The very small entomological collection at the Institut National de la Protection des Végétaux in Ghardaia contains only three butterflies — 2 male *D. chrysippus* and 1 male *Pieris rapae* Linnaeus, 1758 (identified as *P. napi* !); according to an official of the Institute, *D. chrysippus* is a regular visitor to the Institute gardens.

Without exception, butterflies seen by the author in Algeria have been of the nominotypical form.

TUNISIA : On 4 October 1992, single specimens were seen at Degache and Tozeur ; the butterfly was very common in an oasis on the southern outskirts of Douz, about 150 individuals were seen in one afternoon including seven pairs in copula. Two larvae were noted on (?) *Cynanchum* sp. (Asclepiadaceae). One freshly emerged male f. *alcippus* was seen ; the remainder of those seen at Douz and subsequently elsewhere in Tunisia, were f. *chrysippus*. On 5 October it was also common (including one pair seen in copula) in cultivated areas on the western outskirts of Gabes ; the following day two were seen flying in Gabes town centre and singletons seen at Oudre ; in the desert 42km west of Gabes ; El Guettar and Gafsa. On 7 October it was flying quite commonly in a dry river bed on the outskirts of Moulares and 3 days later, three were seen ca. 30km north of Sbeitla.

In 1993, a year when the Spring season was delayed, one *D. chrysippus* was seen on the eastern outskirts of Gafsa and another near El Guettar on 30 March ; on 5 April a single specimen was seen at Douz.

In October 1992, at the Institut National Agronomique de Tunisie (INAT) in Tunis, a display case containing preserved stages and host-plant (*Pergularia tomentosa*) of *Danaus chrysippus* was seen in the foyer of the zoology department, apparently prepared by Monsieur Hédi Smiri, an amateur lepidopterist working at the Institut National de la Recherche Agronomique de Tunisie (INRAT) in Sfax. On 23 March 1993 the author met Monsieur Smiri who confirmed that he had been breeding *D. chrysippus* regularly during the previous ten years from early stages found locally ; a search failed to find any

pupae, the only stage we might have expected to see since the butterfly had not yet emerged that year.

Present Status

Danaus chrysippus is a strongly migratory butterfly, with individuals often wandering far from established colonies. However, there is strong evidence that the species has established breeding colonies in Morocco, Algeria and Tunisia within the last 50 years.

MOROCCO : *Danaus chrysippus* is clearly well established in the Sous valley, where it has almost certainly been resident since 1947 or earlier. It seems likely that the Morocco populations originated from western Africa ; forms *alcippus* and *alcippoides* form a significant percentage of the population.

Although other Asclepiads are available, particularly in the south of the country, the only confirmed hostplant utilised by *D. chrysippus* in Morocco is *Asclepias curassavica*, introduced into Africa as a garden plant from Tropical America (Owen, 1971 : 34). The plant, which grows as a weed on the edges of fields and irrigation ditches around Taroudannt, seems to be irregularly but routinely destroyed by the local farmers and this probably has a direct bearing on the fluctuation of the *D. chrysippus* population. The botanist J. Gattefossé appears to have been the first to find *curassavica* in the Taroudannt area of Morocco in 1940 (Gattefossé, 1941 : 214).

ALGERIA : It is interesting that the "invasion" of *D. chrysippus* to the Ghardaia and Touggourt areas recorded by Demaison in 1923 consisted exclusively of f. *alcippus*, whereas those seen in recent years have all been (where recorded) of the nominate form. Clearly, the butterfly has established for some years a breeding population at Ghardaia and Touggourt and probably elsewhere in that region.

The hostplant(s) in Algeria is not clearly established. However, with the exception of Tamanrasset where the butterflies were seen only in the town centre, the asclepiad *Pergularia tomentosa* was present, usually commonly, in every locality where the author observed the butterfly. It seems likely therefore that this is the hostplant, though not necessarily the only one. *Calotropis procera* and other *Calotropis* species (Asclepiadaceae) have been suggested as hostplants although, if that were so, one might reasonably expect *D. chrysippus* to be more common and widespread than it is in Algeria, since *procera* is a very common plant in the desert. It is a hostplant of *D. chrysippus* in West Africa (VAN DER HEYDEN, 1992).

TUNISIA : The butterfly is a notable vagrant and the relatively numerous records from various parts of Tunisia in the last 15 years may herald a spread in distribution from those areas of southern Tunisia (Sfax, Gabes, Douz etc.) where it appears to have been resident for some years. Although occasional individuals of f. *alcippus* occur, the resident form is apparently nominotypical like that to the west in east central Algeria.

The primary hostplant in coastal Tunisia, including Sfax, Gabes etc., is *Pergularia tomentosa*, not recorded amongst the more than 50 Asclepiadaceae hostplants for *D. chrysippus* listed by ACKERY & VANE-WRIGHT (1984 : 210-211). At Douz, the hostplant seems to be a (?) *Cynanchum* species ; the number of other possible asclepiad hostplants in Tunisia makes it quite likely that other species are also utilised.

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